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Effectiveness of a Mobile Application Empowerment Educational Program on Nurses' Attitude and Competencies in Patient Safety

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Patient safety is a global issue that must be prioritized in health care facilities, Patient Safety Incidents often occur and one of the causes is human error from health workers, therefore it is important to improve the quality of Human Resources, especially Nurses in Health Care Facilities by utilizing technological developments to increase effectiveness and efficiency. The purpose of this research is to determine the effect of mobile application empowerment educational program on nurses knowledge, attitude and competencies towards patient safety. The design of this study was purely experimental, the population was all nurses implementing the inpatient ward in 3 hospitals in Medan City (Murni Teguh Memorial Hospital, Rosiva Mother and Child Hospital and Susanna Wesley Hospital) as many as 860 nurses. Sampling was determined by the proportional random sampling method of 300 nurses. Showed that there was an increase in scores between before and after being given learning using the Mobile Application (Wilcoxon Test P value <0.001), being given learning between the intervention and control groups (Mann-Whitney Test P Value <0.001). There is an influence of the use of mobile applications (SBN Patient Safety) as a learning method on the attitudes, and competencies of respondents Multivariate ANOVA (MANOVA) test shows that all four significant values of Pillai's Trace, P Wilks' Lambda, Hotelling's Trace, Roy's Largest Root <0.001). In this study, mobile Application was well received as a learning method to improve nurses' attitudes and competencies about patient safety. It is expected that health service facilities and all related parties will maintain and improve the quality of health services by implementing patient safety as an effort to prevent patient safety incidents.

Keywords: Patient Safety, Nurse Attitude, Nurse Competence, Mobile Application

INTRODUCTION

The issues of primary medical negligence, medication safety, and personal education and training are critical for healthcare institutions worldwide (Wang et al. 2019). Indeed, nurses must promote patient health and prevent adverse events to improve patient safety (Sim et al. 2019). In addition, nurses are considered important patient safety relation between patients and other healthcare professionals and play a vital role in promoting safety issues and improving patient outcomes. Individual nurses have perspectives on safety practices that can affect patient outcomes (Han & Roh, 2020).

On the other side, fear of reporting errors is an indicator of a substandard safety culture, as identifying and investigating errors is considered essential to improving patient health by developing strategies to prevent recurrence of similar incidents (Alanazi et al. 2022). Patient safety is the main thing that must be maintained and improved services and one strategy to

improve patient safety is to improve patient safety culture. Many studies have been carried out on measuring patient safety culture, one of which is research carried out by identifying 24 tools for assessing patient safety culture. in hospitals in the Czech Republic, seven of them were developed for specific workplaces, the others are considered general.

Eighteen tools may be used by all healthcare professionals in a hospital setting and only three are aimed specifically at nurses (Butarbutar, 2022). The most commonly used instruments are the Hospital Survey on Patient Culture and the Safety Attitude Questionnaire. Measurement of patient safety culture is also carried out in primary health services in Indonesia and from the research results it was found that there are still several dimensions in measuring patient safety in primary health services that have low value and requires improvement (Mutia & Dhamanti, 2023). Measurement of patient safety

in primary health care is carried out using the Safety Attitudes Questionnaire Ambulatory Version (SAQ-AV), Medical Office Survey on Patient Safety Culture (MOSPSC), and Hospital survey on patient safety culture (HSOPSC). In the SAQ-AV instrument, the dimensions of management perception, working conditions, and job satisfaction have low values and need improvement.

While in the MOSPSC instrument, the dimensions of work pressure and speed, the dimension of leadership support, and the dimension of staff training. In the HSOPSC instrument, the dimensions of reporting frequency, the dimension of staffing, the dimension of not punishing mistakes, and the dimensions of hands-off and transition have low values and need improvement. Further evaluation is needed on the implementation of patient safety culture in primary health care, so that each dimension of patient safety culture can run optimally and the implementation of patient safety in primary health care can be improved.

In accordance with the Vision of the World Health Organization (WHO) Global Patient Safety Action Plan 2021-2030, namely a world where no one is harmed in health care, and every patient receives safe and respectful care at all times, everywhere with the aim of achieving the maximum possible reduction of avoidable harm in unsafe health care globally, this is the goal because recognizing that improving and ensuring patient safety is a growing challenge to the delivery of quality health care globally, the 72nd World Health Assembly (WHA) in 2019 adopted resolution WHA 72.6 on global action on patient safety.

It urges Member States and, where appropriate, regional economic integration organizations to recognize patient safety as a health priority in health sector policies and programs. The WHA also requested the Director-General, among others, to formulate a global patient safety action plan in consultation with Member States and all relevant stakeholders, including in the private sector, for submission to the 74th WHA in 2021 through the Executive Board at its 148th session. In response, the Secretariat has begun development of a draft global patient safety action plan.

The action plan aims to provide Member States and other stakeholders with an action-oriented framework to facilitate the implementation of strategic patient safety interventions at all levels of the health system globally over the next 10 years (2021-2030). Patient safety is a fundamental aspect of the quality of medical care and a global public health priority (Han & Roh, 2020). Patient safety is the act of avoiding, preventing, or improving adverse outcomes or injuries that occur throughout the medical process in hospitals.

Patient safety reduces unnecessary risks and medical harms to acceptable levels by minimizing errors. Based on a systematic review of patient safety and quality in Southeast Asian countries, it is recommended that more extensive research on health care safety and quality be conducted and that patient safety interventions created for

developed countries can be directly applied to developing countries (Malinowska-Lipień et al., 2021).

Several studies have been conducted on the relationship between attitudes and the implementation and implementation of patient safety in health care facilities, based on research conducted by (Sulakono, et al. 2020), it was found that there was a relationship between nurses' attitudes and the implementation of patient safety in inpatient rooms ($C = 5\%$, $N = 32$ with $p = 0.039$), Attitude is said to be an evaluative response. Responses will only arise when individuals are faced with a stimulus that requires an individual reaction. A positive attitude can be realized if it is based on responsibility for everything that has been chosen with all the risks which is the most important attitude.

In addition, nurse patient safety competency will reduce avoidable adverse events (Han & Roh, 2020). Remarkably, mobile application (app) technology has been developed and used in nursing education as a means to provide better access to quality educational materials that can be accessed anywhere, anytime (Lee, Ahn, & Lee, 2022). Indeed, several aspects of clinical practice have been transformed by the use of mobile apps by healthcare professionals including nurses. The prevalence of mobile apps in healthcare has led to the rapid expansion of medical software applications for these platforms (Chandran et al., 2022).

Several mobile apps are currently available to assist healthcare professionals in performing essential tasks, including knowledge, information and time management, patient management and monitoring, clinical decision making, and medical education and training (Olaoye et al., 2020; Delia, 2021). Mobile applications are an integral part of education including nursing education, because this learning media can function as a very useful additional media as capital for learning, many things can be done at once by utilizing technology.

In this context, expanding the integration of technology into educational programs is essential to equip with digital health skills, in order to be proficient in utilizing technology to provide quality patient care (Ton et al., 2024). Research on the use of smartphone applications was also carried out in 3 hospitals in West Iran and the results showed that the average score of knowledge, attitude and performance of nurses had increased significantly over time (Hojati et al. 2023), as well as with research that has been carried out by using a web application to increase the knowledge of nurses which was carried out on operating room nurses in several hospitals in Iran, the results showed that the average knowledge score after being given the intervention was significantly higher than before the intervention, This shows that the use of applications in interventions has a positive influence on nurses (Khorammakan et al., 2024).

METHOD

Study Design

The research design used in this research is a pure experimental design. In this study, researchers divided the samples randomly into two groups, namely the experimental group that was given treatment (experimental group) and the group that was not given certain treatment (controlled group) (Turner, 2020).

Sample/Participants

The number of samples used is determined using the Slovin sampling formula, which is a formula used for a known population size(Mukti, 2025).

$$n = \frac{N}{1 + Ne^2}$$

To reduce the risk of undersampling due to research errors, the number of samples used in this study was increased by 10% to 300 samples. The sampling technique was carried out using proportional random sampling, so that the distribution of the number of samples used in the 3 research loci was proportional. The number of samples in each hospital is as follows:

Table 1. Population and Research Sample (Source: Murni Teguh Hospital Group, 2023).

No	Hospitals	Pop.	n	Intervention	Control
1	Murni Teguh Memorial Hospital	640	224	112	112
2	Rosiva Hospital	100	34	17	17
3	Susanna Wesley Hospital	120	42	21	21
Total		860	300	150	150

Instruments

In this study, we used a questionnaire instrument, namely the Questionnaire of Attitude and Competence of Nurses Towards Patient Safety. Technically, data were collected using structured questionnaires. The primary instruments were the Patient Safety Attitude Questionnaire (14 items) and the Nurse Competency Questionnaire for Patient Safety (21 items), which were administered during both the pre-test and post-test phases. In addition, the Technology Acceptance Model (TAM) Questionnaire was used to evaluate participants' acceptance of the SBN Patient Safety application. TAM was selected for its simplicity and reliability in assessing technology adoption and user needs.

This study also used the Technology Acceptance Model (TAM) questionnaire. TAM has the simplicity to be used as a tool to measure the acceptance of new technology or assess the needs of different user groups (Wicaksono, 2022). The purpose of creating this

questionnaire is to see the description of user acceptance of the SBN Patient Safety Application descriptively, user acceptance where the list of questions refers to the research model.

Data Collection

Primary data is data obtained directly from nurses in three hospitals in Medan obtained by distributing questionnaires to respondents. In this case, the researcher directly provided the questionnaire by visiting nurses in the hospitals that the researcher had determined. To collect data using a pretest-posttest design with experimental and control groups to evaluate the effect of mobile applications on nurses attitudes and competencies.

Data Analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25 for Windows. Analysis was carried out in three stages. First, univariate analysis was performed to describe the distribution of respondent characteristics and study variables. Second, bivariate analysis was used to examine differences in attitudes and competencies between groups, employing paired sample t-tests and independent sample t-tests. For data that did not meet normality assumptions, the Wilcoxon signed-rank test and Mann–Whitney U test were applied. Normality of distribution was verified using the Kolmogorov–Smirnov test. Finally, multivariate analysis was conducted using Multivariate Analysis of Variance (MANOVA) to assess the simultaneous effects of the intervention on multiple dependent variables (attitudes and competencies). This approach enabled a comprehensive evaluation of the intervention's impact across outcome measures.

RESULT AND DISCUSSION

Respondent Characteristics

Based on age, 104 respondents (69.3%) in the intervention group and 99 respondents (66.0%) in the control group were aged <30 years or called generation Z. Most respondents, both in the intervention group (94.7%) and the control group (92.0%) were female. Based on marital status, in the intervention group, 52 respondents (34.7%) and in the control group, 38 respondents (25.3%) were married. 86 respondents (57.3%) in the intervention group and 93 respondents (62.0%) in the control group had a professional education background as Nurses.

Table 2. Distribution of Proportion Respondents in Intervention and Control Groups Based on Characteristics.

Characteristics	Intervention		Control	
	n	%	n	%
Gen Z (<30 Years)	104	69.3	99	66.0
Gen X and Y (≥30 years)	46	30.7	51	34.0
Gender				
Man	8	5.3	12	8.0
Woman	142	94.7	138	92.0

Marital status				
Marry	52	34.7	38	25.3
Not/not married	98	65.3	112	74.7
Level of education				
Diploma III (DIII)	64	42.7	57	38.0
Nurse	86	57.3	93	62.0
Work experience				
Pre-Clinical Nurse	51	34	52	34.7
Clinical Nurse 1	49	32.7	51	34.0
Clinical Nurse 2	24	16	18	12.0
Clinical Nurse 3	17	11.3	16	10.0
Clinical Nurse 4	9	6.0	13	8.7
Patient Safety				
There is	133	88.7	134	89.3
There isn't any	17	11.3	16	10.7

Based on work experience, the proportion of work experience grouping of respondents in the intervention group was the most in Clinical Nurses as many as 51 people (34%) and in the control group was also not much different as many as 52 people (34.7%) and the least number in the intervention group was Clinical Nurses 4 (6%) and in the control group as many as 13 people (8.7%). The proportion of respondents who had training experience was almost the same between the intervention and control groups, namely 89%.

The average knowledge score in the intervention group was 11.72 with the lowest score being 8 and the highest score being 18, while in the control group the average knowledge score was 12.21 with the lowest score being 8 and the highest score being 17. The average attitude score in the intervention group was 48.58 with the lowest score 29 and the highest score 67, while in the control group the average attitude score was 48.09 with the lowest score 32 and the highest 56.

Table 3. Description of nurses' attitudes and competence towards patient safety in the Intervention and Control groups before the Intervention.

Variables	Mean	Diff.	SD	Min	Max
Intervention	48.58	0.49	5.71	29	67
Control	48.09		4.81	32	56
Competence					
Intervention	71.97	2.96	5.42	48	90
Control	74.93		7.64	45	95

The average competency score in the intervention group was 71.97 with the lowest score being 48 and the highest score being 90, while in the control group the average competency score was 74.93 with the lowest score being 45 and the highest being 95. The results of measuring the level of knowledge, attitudes, and competency of respondents towards patient safety in the initial data measurement or before the intervention was carried out were known to be almost the same between the intervention and control groups.

Table 4. Increase in knowledge scores, attitudes and competencies between before and after intervention in the Intervention group.

Variables	Intervention Group			
	Mean	Mean Difference	SD	P Value
<i>Attitude</i>				
Before	48.58	18.23	5.71	<0.001
After	66.81		4.45	
<i>Competence</i>				
Before	71.97	22.03	5.42	<0.001
After	94.00		7.66	

The results of the analysis show that in general there was an increase in the knowledge, attitude, and competence scores of respondents in the second measurement or after being given learning, both in the intervention group using the mobile application and the control group using the manual module. In the group using mobile application, the average knowledge score before learning using the application was 11.72 and after using the application increased to 16.44, meaning that there was an increase in the average knowledge score of 4.72 points.

Table 4. Increase in attitudes scores and competencies between before and after intervention.

Variables	Control Group			
	Mean	Mean Difference	SD	P Value
<i>Attitude</i>				
Before	48.09	6.94	5.71	<0.001
After	55.03		4.81	
<i>Competence</i>				
Before	74.93	6.88	5.42	<0.001
After	81.81		7.64	

The average attitude score before learning was 48.58 and after learning was 66.81, meaning that there was an increase in the attitude score of 18.23 points. The average competency score before learning was 71.97 and after learning was 94.00 with an increase competency score of 22.03 points. In the control group, the average knowledge score before learning was 12.21 and after

learning was 14.99, meaning that there was an increase in the average knowledge score of 2.79 points. The average attitude score before learning was 48.09 and after learning was 55.03, meaning that there was an increase in the attitude score of 6.94 points. The average competency score before learning was 74.93 and after learning was 81.81. The results of the Wilcoxon Test for all variables showed a p value <0.001, meaning that there was a difference in scores between before and after learning was given in both the group using the mobile application and the group using the module. However, although both groups showed an increase in scores in knowledge, attitudes, and competencies, the increase in scores in the Intervention group (using the mobile application) was higher.

The results of the analysis of the difference in scores after the intervention showed that the average knowledge score of the group given learning using the mobile application was 16.44 while the group whose learning used the module had a score of 14.99. The average attitude score in the intervention group was 66.81 while the control group was 55.03.

Table 5. Differences in attitude and competence scores towards patient safety after intervention between intervention and control groups.

Variables	Mean	Mean Difference	SD	P value
Attitude				
Intervention	66.81	11.78	4.45	<0.001
Control	55.03		5.88	
Competence				
Intervention	94.00	12.19	7.66	<0.001
Control	81.81		9.99	

The average competency score in the intervention group was 94.00, while in the control group it was 81.81. The Mann-Whitney U test obtained a p value for all variables <0.001, meaning that there was a difference in the average knowledge, attitude, and competency scores after being given learning between the intervention group (which used the mobile application) and the control group (which used the module).

Table 6. The Effect of Using Mobile Applications on Increasing Knowledge, Attitudes, and Competencies

Score Improvement	Mean	SD	P Pillai's Trace	P Wilks' Lambda	P Hotelling's Trace	P Roy's Largest Root
Attitude						
Mobile application	18.23	5.97	<0.001	<0.001	<0.001	<0.001
Module	6.94	6.30				
Competence						
Mobile application	22.03	9.21	<0.001	<0.001	<0.001	<0.001
Module	6.88	8.91				

The results shows that the influence of mobile applications on increasing respondents' knowledge, attitudes, and competencies using the Multivariate ANOVA is 4.72 with a standard deviation of 2.37, while in the group using module learning is 2.79 with a standard deviation of 2.15. The average increase in attitude scores in the group given learning using mobile applications was 18.23 with a standard deviation of 5.97, while in the group using module learning the increase in attitude scores was 6.94 with a standard deviation of 6.30.

The average increase in competency scores in the group given learning using mobile applications was 22.03 with a standard deviation of 9.21, while in the group using module learning the increase in competency scores was 6.88 with a standard deviation of 8.91. The results of the statistical test show that the four significant values of Pillai's Trace, P Wilks' Lambda, Hotelling's Trace, Roy's Largest Root <0.001, meaning that the use of mobile

applications as learning influences the knowledge, attitudes, and competencies of respondents.

The results of the study showed that there was an increase in attitude and competency scores in the intervention group that was given a learning program using the SBN Patient Safety Mobile Application. Based on the results of the Wilcoxon Test, all variables showed a p value <0.001, meaning that there was a difference in scores between before and after being given learning using the SBN Patient Safety Mobile Application in the intervention group. Patient safety is an important aspect and a priority for every healthcare institution worldwide (Health Service Executive, 2021).

The quality of healthcare services can be improved by regulating patient safety in every healthcare facility through the implementation of risk management in all aspects of services provided by the healthcare facility. The implementation of patient safety targets and standards in

hospitals is a priority which is one of the indicators in assessing accreditation status to determine hospital rankings, patient safety targets consist of 6 patient indicators, namely correct patient identification, improving effective communication, drug safety that must be watched out for, reducing the risk of infection due to health care, and reducing the risk of injury due to falls, which are included in the hospital quality assessment through national and international accreditation.

Every healthcare facility such as a hospital continues to strive to improve the implementation of patient safety targets, but the fact is that in Indonesia there are still many who have not implemented or implemented it optimally, there are still many unexpected incidents or patient safety incidents that occur in healthcare facilities. An incident or event is an occurrence that does not conform to the habits and routines of patient care in accordance with the existing standard operating procedures used in the treatment room, therefore various efforts need to be made to improve the quality of nursing care and prevent unwanted incidents by improving the knowledge, attitudes and competencies of health workers, especially nursing staff (Mistri, Badge, & Shahu, 2023).

Commitment to patient safety worldwide has increased since the late 1990s, driven by two influential research reports: *To Err is Human*, produced by the Institute of Medicine in the United States, in 1999, and *An Organization with a Memory*, produced by the Surgeon General of the United Kingdom in 2000. Both noted that medical errors are common in health care, occurring in about 10% of cases when patients are admitted to hospital. In some cases, the harm to patients is serious, even fatal. Since the publication of these two influential reports, the effort to improve the safety of patient care has become a global movement.

It has also brought about a remarkable transformation: patient safety is a deeply personal issue. Patient food safety, a real-world issue, was once a minority academic subject, but has now become a top priority in health care systems. Nevertheless, the state of patient safety worldwide remains a highly guarded resource. Given the wide variation in data on the magnitude and nature of errors and the frequency of incidents, it is clear that unsafe medical care is an element present in almost every aspect of health care. In the past three years, WHO has studied the relationship between education and health practices. health safety systems.

Therefore, WHO has developed a patient safety curriculum guide that discusses various ideas and methods to teach and assess patient safety more effectively, but in Indonesia, the patient safety curriculum has not been a priority (Patterson, 2024). Nurses need to understand how systems impact patient quality and safety, and how poor communication can lead to harm. Nurses must learn how to navigate these challenges. Patient safety is not a stand-alone discipline. Rather, it is an integrated area of health care. Patient safety programs and other projects aim to ensure the safety of health care and communicate it to physicians.

Hospitals as health care facilities can be said to have a good health care system if all health care processes can be carried out well in the field of patient safety and security, increasing patient safety and security and decreasing the number of unexpected incidents to be assessed that the health care facility is good. The patient safety system consists of the process of risk assessment, identification and management of matters related to patient risk. A person's behavior and actions are influenced by knowledge which is the basic domain that forms it and attitude as an aspect that comes from within a person in this case, namely health workers such as nurses in taking action and behaving towards certain objects (Pratiwi et al. 2022).

Nursing competence is seen as the whole of a nurse who provides professional services to clients, including the knowledge, skills and considerations needed in practical situations. Competence in the world of nursing reflects: Knowledge, understanding and appreciation; Various cognitive, psychomotor and relational technical skills; Personality, attitude and behavior. The attitude that needs to be emphasized as a nurse ready to work at home and abroad with Indonesian cultural characteristics is Hello, Smile, Greetings, Politeness and Courtesy. Competence is not only in the field of science and knowledge, but attitudes and beliefs towards the values of a nurse and having an attractive appearance are also no less important.

Professional competency standards are more oriented towards performance quality, namely describing the performance that is expected and can be done by someone with that ability (et al. 2022). Several studies have been conducted on the relationship between competence and patient safety, one of which is a study conducted by (Rizany et al., 2021). The study was conducted on nurses in three hospitals (n = 155 people), the inclusion criteria were nurses who had worked for at least 1 year and did not take leave. Data were analyzed using the Spearman correlation test. The results showed that the average nursing competence was 88.09 and the average patient safety was 54.21. There is a significant relationship between nurse competence and the safety of hypertensive patients ($p = 0.006$ $r = 0.219$). Correct nursing skills provide more effective, efficient and safe services for patients.

Attitude is a person's closed response to a stimulus or object, either internal or external, because its form cannot be seen directly, but can only be interpreted from the closed behavior. Attitude actually shows that the response is correct. Attitude measurement can be done directly or indirectly, through the respondent's opinion or questions about an object, using indirect questions. Hypothesis, then the respondent's opinion is put forward, as knowledge, this attitude has different levels, namely: Expectation. This means that people (subjects) want and pay attention to the stimulus given (object), Response: Giving answers when asked, doing or carrying out certain tasks is an indication of a person's attitude, Evaluation: Inviting others to do or discuss a problem is an indicator

of the third level of attitude, Responsibility: Responsibility for everything that is chosen, with all its risks, is the highest attitude (Yuan et al. 2023).

The results of this study are in line with research conducted (Kim & Sim, 2020) Mediating Factors in Nursing Competency: A Structural Model Analysis for Nurses' Communication, Self-Leadership, Self-Efficacy, and Nursing Performance, the research method used was Sixty-six senior nursing students were randomly assigned to the experimental or control group. The experimental group used the interactive nursing skills mobile application for 1 week. The control group was given a mobile application containing non-interactive nursing video content for 1 week. Before (pre-test) and 1 week after (post-test) the use of the mobile application, participants' self-efficacy in nursing practice, and nursing skills performance were assessed, from the results of the study it was found that the experimental group showed significantly higher they showed a significant increase in self-efficacy before and after the intervention compared to the control group ($t = 2.46$, $p = 0.017$). The nursing skills performance of the experimental group also increased significantly after the intervention with a significant difference ($t = 7.05$, $p < .001$).

Research on the application of mobile health applications by nurses has also been conducted by (Nezamdoust et al. 2022) in Iran with the research method used, namely identifying literature in depth and comprehensively obtained through various sources with various research methods, in this study the data was obtained by searching for related keywords in the Google Scholar, Scopus, Cochrane, EMBASE, Ovid, and PubMed databases from various sources from January 2000 to March 2019, Regarding the reasons for using mobile applications by nurses, five goals were identified, namely learning and increasing knowledge, treatment and improving patient care processes, diagnostic processes, data and patient management, and health promotion. Supporting factors in the use of mobile applications by nurses are categorized into eight: ease of use, usefulness, security and confidentiality, feasibility and functionality, interface design and use, effectiveness, infrastructure, flexibility, and social norms.

This study has several strengths, including the use of a true experimental design with randomization, a sufficiently large and proportionally distributed sample across three hospitals, and the integration of mobile application-based learning which is relevant to current technological developments. The evaluation of multiple outcomes knowledge, attitudes, and competencies, supported by robust statistical analysis further strengthens the validity of the findings. However, the study also has limitations, such as being conducted only in three hospitals within the same network, reliance on self-reported questionnaires that may introduce bias, and the short-term nature of the evaluation which does not capture long-term sustainability. In addition, contextual factors such as workload or organizational culture were not controlled, and the focus was limited to inpatient ward nurses.

CONCLUSION

There was an increase in attitude, and competence scores in the intervention group, based on the Wilcoxon Test Results all variables showed a p value < 0.001 , meaning there was an increase in scores between before and after being given learning using the SBN Patient Safety Mobile Application. The average attitude score of reporting before learning was 48.58 and after learning was 66.81, meaning there was an increase in the attitude score of reporting by 18.23 points. The average competency score before learning was 71.97 and after learning was 94.00, meaning there was an increase in the competency score of 22.03 points.

Declaration of Conflicting Interest

No conflict of interest to declare.

Data Availability Statement

The dataset generated during and analyzed during the current study is available from the corresponding author upon reasonable request.

Declaration of Use of AI in Academic Writing

Nothing to declare

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